THE EFFECTS OF OIL SPILLS ON BIRDS

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| **Call to Order** | ***Why do birds have feathers? What functions do feathers help birds perform?*** | **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |

**Background**: The impacts of environmental pollution are often difficult to see.  A major oil spill, however, provides dramatic evidence of potential impact to wildlife. All forms of life are affected by such a disaster.  Many people are involved in efforts to prevent oil spills and their consequences as well as help clean up efforts should an accident occur.  Such actions are not always successful and sometimes have unfortunate consequences as well.  The purpose of this activity is to examine some of the possible consequences of oil spills on birds.

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| 1. Examine a feather. Sketch the feather in the circle to the right, labeling the **shaft**, **vane** and **barbs**.  2. Take the feather and submerge it in the cup of water. After 3 seconds, take it out and hold it up. How does the appearance of the feather change from when it was dry?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  3. We will do the next part together since we all need to start the clock at the exact same time! Take the wet feather and lay it on the paper towel. Record how long it takes for the feather to dry by looking at the stopwatch provided on the computer screen.  *Time: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* | |  |
| 4. Now, simulate an oil spill by dipping the feather in oil, submerging it for 3 seconds. Remove the feather and hold it up. How does the feather look now?  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | | |
|  | 5. Draw a picture to visually record your observations in the circle below and to the left.  6. Birds caught in oil spills are washed with liquid soap detergent to remove the oil. Wash the feathers in the cup labeled “Washing”, which contains a few drops of dawn.  7. What does the feather look like now? Write your observations in the space below:  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  8. Lay the feather on a paper towel and wait for it to dry completely. Record the time it takes for it to dry now.  *Time: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* | |
| **9. Did the dish soap clean off the oil? How do you know?**  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** | | |

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| Post-Laboratory Questions  Read*:* Birds often use their beaks to comb through their feathers in a process called “preening.” As they do, they often spread around special oil that is secreted (or *released*) from near their tail. | Picture 1 |

*1. Which of the two feathers – the one dipped in water, or the one washed in dish soap – dried the fastest?*

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*2. Why do you think that this is so?*

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*3. When you dipped the feather into the oil and pulled it out, what did you notice happened to the feathers of the bird?*

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*4. How do you think an oil spill would affect a bird’s ability to fly? Explain.*

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*5. How do you think an oil spill would affect a bird’s ability to keep itself warm? Explain.*

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*6. You saw in the lab that the time it took for the feathers to dry after they had been washed was far greater than it was before the oil had even gotten on them. Why do you think that washing the birds with dish soap might affect the ability of their feathers to perform their functions (enable them to fly, keep them warm, etc.)?*

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*7. In order to let a bird go back into the wild after washing it, what do you need to make sure to do?*

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*8. Rank the following by putting a number from (1-3) best to worst next to the bird’s choices:*

\_\_\_\_\_\_\_ Normal, preened feathers \_\_\_\_\_\_\_ Feathers dipped in oil \_\_\_\_\_\_\_ Washed feather

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| **Shampooing to Stop Oil Spill Bird Deaths**  John Roach, for National Geographic News September 21, 2004  Every year at least half a million water birds die from encounters with spilt oil, according to Jay Holcomb, executive director of the International Bird Rescue Research Center in Fairfield, Calfornia. But on occasion rescue teams arrive on scene in time to scrub the birds' feathers clean and prevent calamity.  Take, for example, the response when approximately 1,300 tons of oil spilled from the bulk ore carrier *Treasure.* The ship sank in the Atlantic Ocean in June 2000 about 20 miles (30 kilometers) from Cape Town, South Africa.  Peter Barham, a scientist with Bristol University in England, was part of the international rescue effort. He said approximately 20,000 African penguins were covered in oil from the spill.  "It took about six weeks, the teams working day and night, to clean all those birds," Barham said in an interview with the radio program *Pulse of the Planet.*  Rescue teams also temporarily relocated 20,000 additional penguins from an island in the oil slick's path. In terms of animal numbers, the rescue effort was the largest ever attempted.  Experts estimate 90 percent of the rescued birds survived. Today the African penguin population is thought to be 19 percent larger than it would have been without the effort, according to University of Cape Town researchers who monitor the birds.  **Oiled Death**  Holcomb, of the International Bird Rescue Research Center, said the cleanup success at the *Treasure* oil spill is an exception, not the rule.  He said penguins have several layers of fat to burn for energy and are relatively easy to manage in captive situations. During oil spills, these characteristics allow the birds to survive longer in the wild before rescue teams arrive and to cope with human handling.  "If they had been any other birds, we wouldn't have saved 50 percent of them," Holcomb said. Most oiled birds, he added, die from exposure to the cold before rescue workers have time to reach them.  When birds encounter spilt oil, the slimy substance strips feathers of their waterproofing nature. Holcomb explained that feathers are normally "aligned at a microscopic level like Velcro. They all hook together so tightly that water can't penetrate them."  Oil causes birds' feathers to mat together into separated clumps. This allows water to seep between the feathers and skin and exposes the animal to the elements. This usually causes birds to freeze to death, but it can also lead to overheating.  Oiled birds instinctively preen their feathers. When they do, the animals ingest toxins that damage internal organs.  The birds' focus on preening also diverts their attention from the essential tasks of eating and evading predators, Holcomb said. If exposure to the elements doesn't kill the birds, long-term health impacts or a predator will.  Millions of small oil spills, primarily from ships cleaning their bilges, go unreported and undetected each year. Such slicks kill hundreds of thousands of birds.  Off the coast of Newfoundland, Canada, for example, some 300,000 birds die from oiling each year, according to Canadian government studies. Off the southern coast of South America, as many as 40,000 Magellanic penguins die from oiling, according to Holcomb.  **Bird Cleaning**  For birds to survive catastrophic oil spills like the *Treasure,* well-equipped bird-rescue crews must be mobilized quickly. Human handlers arrive with food and water.  Once the birds are stabilized, the cleaning process begins. The animals are placed in plastic dish tubs and, using a mixture of warm water and a dab of mild soap, rescue workers scrub the birds' feathers. For the eyes and ears, a water pick or toothbrush is used to avoid damaging sensitive organs.  "Really what we're doing is shampooing the birds. We do it vigorously, but they don't like to be handled. So we do it quickly—quickly but efficiently," Holcomb said.  Once scrubbed, the birds are rinsed with warm water, placed in cages with air dryers, and—after they're dry—released into a pool of warm water.  "They instantly want to bathe, get their feathers in order," Holcomb said. As part of the preening process, the birds rub a natural oil, which is secreted from a gland at the bottom of their tails, over their feathers. The oil acts as a conditioner.  When the birds regain a natural weight and blood values, they are released back into the wild. What happens next, for most species, is an open question. The technology to track wild birds is too invasive to deploy. | QUESTIONS:  How many birds die each year from spilt oil?  Where did *Treasure,* the ship carrying oil sink? Find it on a map.  What wildlife was affected?  How long to clean-up attempts last?  Can the animals go directly back to their homes?  How many rescued animals survived?  Why is the cleanup success considered to be an exception to the rule?  What helped the penguins survive?  What happens to birds when they encounter oil? Describe/ Draw a picture.  What does it mean to “preen”? Why is this bad for a bird who is covered in oil? (Give at least 2 reasons)  How common are oil spills? Can you guess why they happen?  What factors are important for a rescue attempt?  Describe the cleaning process.  Do birds naturally have oil in their feathers?  Do we know for certain that the birds survive after they are cleaned? Why or why not? |